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# SCIENCE NEWS LETTER



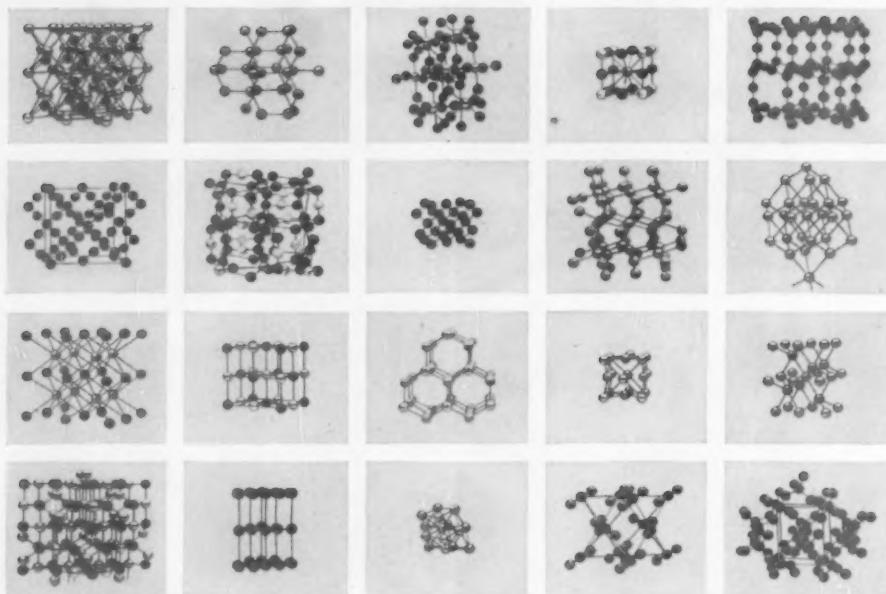
THE WEEKLY SUMMARY OF CURRENT SCIENCE



## Intercontinental Missile

See Page 137

A SCIENCE SERVICE PUBLICATION



Crystal structure models. Top row, left to right: cuprite, zincblende, rutile, perovskite, tridymite. Second row: cristobalite, potassium dihydrogen phosphate, diamond, pyrites, arsenic. Third row: caesium chloride, sodium chloride, wurtzite, copper, niccolite. Fourth row: spinel, graphite, beryllium, carbon dioxide, alpha-quartz.

## FROM ATOMS TO STARS

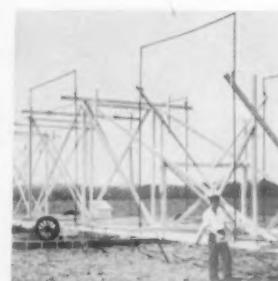
Research at Bell Telephone Laboratories ranges from the ultimate structure of solids to the radio signals from outer space. Radio interference research created the new science of radio astronomy; research in solids produced the transistor and the Bell Solar Battery.

Between atoms and stars lie great areas of effort and achievement in physics, electronics, metallurgy, chemistry and biology. Mechanical engineers visualize and design new devices. Mathematicians fore-

shadow new communications techniques.

Despite the diversity of their talents, Bell Laboratories scientists and engineers have much in common. A habit of teamwork channels these talents into great advances.

These men have developed the world's finest telephone system. In doing so, many have become leaders in their fields. Opportunities for achievement await qualified scientists and engineers at Bell Telephone Laboratories.



Directional antenna used by Karl G. Jansky in discovery of stellar radio signals at Bell Telephone Laboratories in 1932.

**BELL TELEPHONE LABORATORIES**

World center of communications research. Largest industrial laboratory in the United States.



## MEDICINE

# Clue to Anti-Clot Drug

**Chemical structure of heparin, which is used to forestall blood clot formation in heart attack patients, is being probed with an organism found in the earth.**

► THE SECRETS of the human body's own anti-blood-clotting drug, heparin, are being pierced by a kind of germ warfare attack at the National Heart Institute, Bethesda, Md.

Heparin is used to forestall formation of blood clots in patients who have had heart attacks such as President Eisenhower's. It is also used to prevent such clots after surgical operations. Its high cost, however, keep it from being as widely used as some of the synthetic anti-clotting chemicals.

Besides its anti-clotting action, heparin also plays a role in "clearing" fatty blood associated with arteriosclerosis, the serious artery hardening that leads to most heart attacks and kills more than 350,000 persons yearly.

Heparin, however, has for 40 years, since its discovery in 1916, defied efforts of scientists to learn its chemical structure and exactly what happens to it in the body.

The germ warfare attack at the National Heart Institute has given scientists what seems to be the first breakthrough on these heparin chemistry problems.

By using an obscure germ, or organism, found in the earth around the Heart Institute in Bethesda, scientists have for the first time degraded heparin chemically and separated some of the large chemical "building blocks" that make up the anti-clot chemical.

These "building blocks" are being analyzed and attempts will be made to break them down still further. Eventually the scientists hope to learn heparin's structure and perhaps to create it synthetically in the laboratory.

Heparin's role in clearing fatty blood is played with an enzyme chemical called lipoprotein lipase which scientists at the National Heart Institute discovered some time ago.

With the new way of learning more about heparin, the scientists hope to find out more about the body's system for fat transport and from that what goes wrong, and why, to cause the fatty artery hardening that kills.

They hope, also, to get the part of the heparin that works with the enzyme to clear fat, and to get it separate from the part that prevents blood clotting.

The germ warfare attack on heparin was made by Drs. A. Nail Payza and Edward D. Korn. The organism they used belongs to a widespread group known as Flavobacterium. One of these tiny-rod-shaped bacteria actually utilizes heparin for nourishment, the scientists found. In the course of this, it breaks heparin down, something

as our bodies break down meat and other food into their basic chemical parts.

These newly important soil organisms are now being grown at the Heart Institute in pure form. With their aid, the scientists hope to get for study all the components of the complex chemical.

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## BIOLOGY

## Heat Plus Chemical Checks Cancer in Eggs

► HEAT plus a chemical has checked experimental cancers growing in the yolk sacs of embryonated eggs, Drs. Alfred Taylor and Roger J. Williams of the University of Texas and the Clayton Foundation for Research, Austin, Texas, announce in the *Proceedings of the National Academy of Sciences* (Feb.).

Cancer control in humans might be achieved, the Texas scientists believe, by a similar simultaneous use of chemical and physical agents.

The chemical they used in their experiments was TEM, short for triethylenemelamine, already known as capable of checking some experimental cancers. The heat used was enough to raise the temperature of the egg embryos about six degrees Fahrenheit. This also has previously been shown unfavorable to cancer growth.

In the experiments with TEM, the cancer-bearing eggs got one injection of the chemical at the 10th day of incubation and the temperature was raised for 48 hours. Of 140 eggs treated this way, 86 survived to the 16th day of incubation at which time only traces of atypically appearing tumor were present in most of them.

Of 57 control eggs in the same experiment, all but one were killed by the growing tumors. One survived to the 16th day and contained a large tumor.

The scientists declare they do not want to over-emphasize the implications of their experiments for cancer treatment. But they think the approach, that is, use of chemical and physical agents simultaneously, "could lead to further progress and the establishment of some general principles which apply to cancer control."

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**MODEL REACTOR ON TOUR**—French scientists visiting Chalk River see an NRX reactor model that will be shown in Paris during March and then will go on a three-year tour of the Far East. Built by Atomic Energy of Canada Limited, the model will be shown in UNESCO's science exhibit entitled "Energy and Its Transformations." Shown examining it are, from left to right, Dr. D. A. Keys, scientific adviser to the company's president, and Drs. Pierre Mouret and Robert Sartorius, chemists of the French Atomic Energy Commission project at Chatillon, France.

## MEDICINE

# New Quieting Drug

► THE 28-YEAR-OLD woman was lying in the hospital bed with her right hand held up as if to take an oath.

When the doctors and visiting reporters came into the ward, she started weeping and raving incoherently about being a good girl, going to church, being neglected, wanting to go to a hospital. None of it made much sense. She still held up her right hand.

A doctor took her blood pressure and then slowly injected medicine into her veins. Within five minutes she was lying quietly, her right hand no longer upraised. Her eyelids began to droop and her rambling talk stopped as she grew drowsy under the influence of the medicine.

She had given a striking example of the action of a new tranquilizing drug.

She was one of several patients shown visiting doctors and the press at the first clinical presentation of the drug at a medical staff conference of the District of Columbia General Hospital, Washington.

The drug is called Sparine by its manufacturers, Wyeth Laboratories of Philadelphia. It has been known in the laboratory as WY-1094. It is a phenothiazine derivative that scientists will call promazine hydrochloride. It is related chemically to an older tranquilizing drug, chlorpromazine, but lacks the chlorine of that drug.

Sparine is still undergoing extensive testing and is not yet available for general use. At the D. C. General Hospital it has been given to more than 550 patients. About 200 of them, like the young woman, suffered from mental disease, either manic depressive psychoses or agitated stages of schizophrenia.

About 300 alcoholics with delirium tremens have been treated. The doctors and nurses at the hospital demonstrated in a colored motion picture how these patients became calm, rational and in most cases slept normally after a single injection of the drug into the veins.

Patients with acute hallucinations, seeing and hearing things, were similarly relieved.

Once the acute phase had been brought under control by injections of the drug into the veins, patients took it by mouth or had injections into the muscles until they were ready to leave the hospital.

Patients with delirium tremens are ready to leave the hospital in three to four days, compared to the 10 to 12 days needed with other treatment.

The speed with which the drug takes effect is one of the impressive things about it. Another which the doctors pointed out is that, while the patients go to sleep, they can easily be aroused to eat, answer questions and for medical examination.

The new drug has been used effectively in treatment of 50 narcotic drug addicts, easing them through the withdrawal period without the use of any narcotics. It re-

lieves the nausea and retching, makes muscle and bone pains and abdominal cramps more tolerable.

It can also be used for barbiturate sleeping pill addicts.

Advantages of the new drug include: calming without depression, little or no fall in blood pressure, no shock-like collapse, no rapid heart action, no pain on injection, no tissue destruction at site of injection, and, so far, no jaundice or blood cell changes.

It is not in itself a cure, but because it calms the patients it makes possible speedier and more effective use of other methods of treatment.

The conference at which experience with the drug was presented was conducted by the psychiatric staff of the hospital under the direction of Dr. John D. Schultz, chief of psychiatry at the hospital and associate professor of psychiatry at Georgetown University School of Medicine.

Participating in discussion of the drug were: Dr. Jay Hoffman, St. Elizabeth's Hospital; Dr. George Raines, Georgetown Medical School; Dr. Vernelle Fox, Georgian Clinic, Atlanta, Ga.; Dr. Jack Kleh, D. C. Village for the Aged; Dr. Earl Mitchell, chairman, Sub-Committee on Alcoholism, D. C. Medical Society; Dr. Anthony Zapala, D. C. Alcoholic Rehabilitation Program; Dr. James Shea, chief resident, Georgetown Medical Division, and Dr. Paul Sullivan, resident in psychiatry, Georgetown Medical School.

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## SURGERY

## Ear Operation for Deafness One of Safest

► USE of a microscope and an improved aseptic, or germ-free, technique has made an ear operation "one of the safest surgical procedures."

The operation is called the fenestration operation. It consists in cutting an opening through ear-clogging bone formation to relieve one kind of deafness. It is not suitable for all patients.

A record of 4,120 consecutive fenestration operations in 16 years with no death and no case of serious complication was reported for Northwestern University School of Medicine, Chicago, by Dr. George E. Shambaugh Jr.

The microscope that lets the doctor see the unusually small structures within the ear is also used for operations to mobilize the stapes, the stirrup-shaped innermost bone of the ear, Dr. Shambaugh told a regional conference of the International College of Surgeons in White Sulphur Springs, W. Va.

Dr. Shambaugh said tissue studies show the so-called "normal physiological saline

solution," or salt solution, used for irrigation purposes is apt to kill cells or damage them.

"We are hoping," he said, "to interest drug manufacturers in making available to surgeons sterile solutions that are more truly physiological."

Physiological salt solutions are intended to come close, in action, density and osmotic pressure, to most animal fluids, such as blood.

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## GENERAL SCIENCE

# Unanium for Peaceful Use

► PRESIDENT EISENHOWER has authorized the sale or lease of 40,000 kilograms, or about 88,000 pounds, of uranium 235, half of it in the United States and half abroad.

The nuclear material, to be made available over a period of years, will be used for research and development purposes and for fueling nuclear power reactors.

Its distribution marks another step in the program to develop peaceful uses of atomic energy.

In making the announcement, President Eisenhower specified that nations "presently producing uranium 235, or the Soviet Union and its satellites" would not share in the distribution.

The action was taken on the recommendation of Atomic Energy Commission chairman Lewis L. Strauss. It will allow "support of the start of nuclear power programs with a generating capacity of several millions of electrical kilowatts" in Western Europe, President Eisenhower said.

"This action demonstrates the confidence of the United States in the possibilities of developing nuclear power for civilian uses. It is an earnest of our faith that the atom

can be made a powerful instrument for the promotion of world peace."

Distribution of the material will be subject to "prudent safeguards" against its diversion to non-peaceful purposes. The "safeguards" probably consist of atoms of the uranium 238 isotope.

While natural uranium, which contains seven-tenths of one percent of the fissionable isotope 235, gives off too few neutrons to keep a nuclear chain-reaction going, it is well known that its enrichment with added U-235 will produce acceptable fuel for atomic power reactors.

In another possible process, U-235 might be blended with thorium, to give a chain-reacting but safe nuclear fuel.

Extreme purity is required of uranium used in atomic bombs. Separation of the bomb isotope, U-235, from an enriched mixture would require the same diffusion plant equipment as that built at Oak Ridge, Tenn., during World War II to obtain the original fissionable material for the first atomic bomb. No huge diffusion plant is known to exist in any country to which the material to be distributed would be sent.

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## TECHNOLOGY

## Simple Dosimeter

► A HUMAN LIFESAVER, the shape and size of a fountain pen, has been perfected for detecting the amount of deadly radiation received by the body.

Designed for use by the Army and civil defense, the detector weighs less than two ounces and can be clipped to the pocket, or carried in a purse, U. S. Army Signal Corps engineers, Fort Monmouth, N. J., reported.

Known technically as Radiometer IM-93 and nicknamed the "Fountain Pen Dosimeter," the device was developed by the Bendix Aviation Corp., Cincinnati, Ohio, division.

It can record gamma radiation up to 600 roentgens. Over 100 roentgens can cause radiation sickness and 400 can kill.

An easy-to-read scale reveals the total radiation received by the body while the device is being carried. A user peers through the lens at one end, like a telescope, and reads the amount of exposure.

Its simplicity of use and design eliminates special handling and care. The instrument uses a quartz filament fiber activated by an electrical charge stored in a special aluminum and plastic foil capacitor. The charger, powered by a flashlight battery, is only slightly larger than a cigarette pack.

For emergency civil defense use, the dosimeter can be recharged by almost any trained television or radio repairman.

In tests conducted by the Signal Corps,

the "Fountain Pen Dosimeter" was thrown 20 feet against a wall, dropped on concrete, held under water and at high altitudes without affecting its use.

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**TESTING RADIATION DOSE—**  
Pfc. James E. Diestal of Westbury, N. Y., takes a reading of possible gamma rays with a new dosimeter.

## • RADIO

Saturday, March 10, 1956, 2:05-2:15 p.m. EST  
"Adventures in Science" with Watson Davis, director of Science Service over the CBS Radio Network. Check your local CBS station.

Edward F. McClain, electronic scientist, Naval Research Laboratory, Washington, D. C., will discuss "Seeing Stars by Radio."

## AGRICULTURE

## Waste Cellophane As Gardening Aid

► WASTE CELLOPHANE promises to be a valuable aid to both the home gardener and the farmer, tests at the Rutgers University Agricultural Experiment Station, New Brunswick, N. J., show.

Chopped into flakes and impregnated with fertilizer salts, the waste cellophane proved to hold the fertilizer better during leaching than did standard fertilizer salts.

In addition to its use as a plant-growing preparation, waste cellophane also promises to be valuable as a soil amendment and for mulching purposes, R. F. Leyden and S. J. Toth of the Soils Department reported.

Waste cellophane can be composted, they said, if small amounts of limestone and fertilizer are used. The final product has desirable physical and chemical properties comparable to commercially cultivated peat and various other composts.

As a mulch, cellophane flakes reduce the amount of water lost by a plant by evaporation, prevent the slaking of soil surface by impact from applied water, and control weeds.

When used for mulch, they explained, it can be easily recovered or saved for re-use.

The New Jersey soil experts pointed out that the lightness and other qualities of cellophane make it a clean and easy-to-handle product.

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## HISTORY

## Cast of Lincoln's Life Mask Displayed

► A CAST REPLICA of Lincoln's face, believed to be one of this country's earliest bronzes, has been on view at the American Museum of Natural History in New York.

The bronze is the only metal cast made from a life mask made by the sculptor Clark Mills on or about Feb. 12, 1865, Lincoln's 56th birthday, two months before Lincoln's assassination.

It is an exact replica of Lincoln's face at the height of his career and clearly shows every detail of the beloved face.

The cast remained in the hands of the sculptor's sons until 1886 when it came into the possession of John Hay, Lincoln's private secretary and later Secretary of State for Theodore Roosevelt. It is now owned by John Hay's son, Clarence Hay, through whose courtesy the cast was shown.

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## PSYCHOLOGY

# Help Subnormal Children

► TEACHERS may be able to build up the intelligence of subnormal children.

This may be possible, suggests a New York University psychologist, by teaching them to see the relations existing between the objects and experiences of their lives, and to cope with concepts difficult for them.

For example, the child should be aided in discovering how wagons, automobiles and bicycles are basically the same; they all produce movement, have wheels, etc.

This conclusion about intelligence was based on results of a new intelligence test developed by the N. Y. U. psychologist, Dr. Herbert N. Hoffman. Dr. Hoffman's test does not require facility with words as do many intelligence tests, nor does it measure manual dexterity, as do the non-verbal tests.

The world, comments Dr. Hoffman, contains three kinds of people. One group consists of individuals who reveal the upper limits of their mental capacity through use of language. Those in the second group are more capable in manual than in linguistic activities.

Those in the third group do not reveal their highest level of mental attainment in either words or manual activity. Standard intelligence tests put this third group at a great disadvantage.

It is for this third group that Dr. Hoffman's new test is designed. The test has a perceptual approach and tests the ability of the person to form, or deal with concepts.

Faced with cards, each containing a pair of drawings, the person tested had to observe in what way one drawing differed from the other in every pair. In one series of cards, the difference was in size. Thus, size was one concept tested. Others were symmetry, depth, acuteness (lack of roundness), thickness and solidity.

The test was given to 90 school children from 12 to 17 years old. They were in three groups of 30 each according to their performance on a standard intelligence test. One group was subnormal with IQ from 50 to 85, the second group was "average," IQ 86 to 115, and the third was superior, IQ over 115.

Interesting differences showed up between the performance of the three groups on Dr. Hoffman's concept test.

On series I, testing the concept of size, the subnormal group scored slightly higher than the average group and they were not far from the average of the superior group. At least half of the subnormals were able to cope with the concept of size as effectively as, or more effectively than, the superiors.

Series II, symmetry, was the most difficult for the three groups combined, but on this the average group and superiors were equal in performance, the subnormals lagged behind.

Dr. Hoffman questions whether there really is such a thing as a person of average intelligence. This may be just a statistical label attached to persons whose different aspects of thinking vary greatly, but whose successes and failures happen to balance each other.

The subnormal group, Dr. Hoffman found, have common weaknesses and common strengths, but their weaknesses overbalance their strengths. The superior persons are also much like each other in their thinking, but their common strengths overbalance their weaknesses.

The average person is more individual in his thinking.

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## PUBLIC HEALTH

# Speed Up Malaria Fight

► THE FIGHT to rid the world of malaria must be speeded to keep ahead of the resistance to DDT developing in malaria-carrying mosquitoes, Dr. Fred Soper, director of the Pan American Sanitary Bureau, Washington, said on his return from a world tour.

"DDT resistance of the anopheline mosquitoes is one of the things forcing our hands," he stated, referring to the World Health Organization's program, started in 1955, for malaria eradication.

The malaria mosquitoes are rapidly developing resistance to other insecticides, he added. WHO malaria fighters do not know how long governments will be able to carry on malaria control, much less eradication, with present insecticides.

Agricultural use of insecticides to control plant crop pests is adding to the difficulty of the malaria fighters.

Wiping out malaria, Dr. Soper said, is vitally important to the health and the economic and social development of the world.

Before the discovery of DDT, health authorities could be satisfied to control malaria, that is, to keep cases to a minimum in cities and towns, where there were large human and small mosquito populations.

Since the discovery of DDT, however, it has become economically feasible to control malaria in rural areas by using a residual spray in each house.

The WHO malaria eradication program will cost hundreds of millions of dollars. International funds will be needed in addition to those of individual governments.

Hawaii, Japan and the United States have no malaria problem, Dr. Soper reported. Russia claims to have none. Singapore claims no active transmission of malaria exists.

The Philippines have started a nation-

## PHYSIOLOGY

# Would Revise Ideas Of Nose Functions

► OUR IDEAS of the nose and its functions need revising, Sir Victor Negus of the Middlesex Hospital reports in the *British Medical Journal* (Feb. 18).

The nose in mammals, including man, is designed to protect the smelling function rather than to protect its breathing function as generally thought, Sir Victor says.

Close to the nostrils there is an air-conditioning plant, but the humidifying it does is intended to protect the smelling apparatus rather than the breathing function. The olfactory area and the humidifying area are both small in species of mammals with feeble powers of scent and extensive in keen-scented animals.

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wide anti-malaria program.

Thailand is now making progress in its fight on malaria and is looking beyond its own frontiers to collaboration with its neighbors. Technical personnel have been loaned to Vietnam for malaria fighting. This is a step toward regional programs, important so that as each country gets malaria cleaned up, it will not be reinfected by its neighbors.

India, Dr. Soper found, is making a tremendous effort to handle her tremendous malaria problem. She is doing about 50% now of what is needed to rid the country of this disease.

Elimination of malaria in some regions was credited by Dr. Soper as one of five factors responsible for the "nose dive" of tuberculosis throughout the world. A population weakened by malaria is ready prey to TB and other diseases, he explained.

The other four factors Dr. Soper credited for world-wide reduction in tuberculosis deaths in the past few years are:

Lack of war.

Improved nutrition.

Improved working conditions.

Great improvement in tuberculosis treatment, starting with streptomycin and going on to PAS and isoniazid.

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## INVENTION

# Animal Collar Repels Fleas

► TO KEEP FLEAS away from your dogs, Howard J. Peo of Irondequoit, N. Y., invented a flea-repelling animal collar that is disposable. The invention has cotton webbing impregnated with talcum powder and a flea killer. It was awarded patent No. 2,734,483.

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**MEASURING MUSCLE POTENTIAL**—Electronic techniques are being used to determine muscles' proficiency in work and play by Dr. Lee Gregg at Carnegie Institute of Technology, Pittsburgh, Pa. His electronic device measures muscle potentials, the tiny voltages generated in moving, in five body locations. The voltages represent muscle tensions, which indicate proficiency and strength of motivation. Dr. Gregg is shown in the background, separated from Brad Bunnell by a transparent steel-net shield.

## GENERAL SCIENCE

## Plan National Computer

► GOVERNMENT PLANS to support a giant electronic "brain" and two large telescopes, one radio and one optical, were revealed in House appropriations subcommittee hearings.

The National Science Foundation, charged with overall responsibility for basic scientific research by the Government, asked Congress for nearly \$5,000,000 to build the three large facilities, needed for research in mathematics and astronomy.

Also requested was \$1,100,000 to construct three nuclear reactors at universities, to be matched by equal funds from the institutions. The atomic piles would be used for non-secret research and to help train scientists in reactor techniques.

"One of the most important" items in the budget, totaling \$49,500,000 for the fiscal year beginning June 30, 1956, Foundation director Dr. Alan T. Waterman told the subcommittee, is the \$3,500,000 requested for building a 140-foot radio telescope to probe the secrets of the universe.

Radio waves received from planets, stars and other celestial objects provide a new "window" through which scientists can study the universe. Because radio wavelengths cover a considerably wider band

than visible ones, radio astronomers can record much information hidden to the optical astronomer.

To provide facilities for optical astronomers who at present do not have access to large telescopes, the National Science Foundation asked Congress for \$600,000. Recent development of devices known as image converters, which offer a tenfold increase in the amount of light received by a telescope, make the need for up-to-date equipment imperative.

Dr. Waterman pointed out that only one of the seven largest telescopes in the United States, the 120-inch instrument soon to be put into operation at Lick Observatory, has been designed since 1940.

The Foundation requested \$800,000 for the computer facility, which would house one large and two smaller electronic "brains." These are needed both for research and for training "the large number of personnel who will be increasingly in demand in universities, industry and Government."

The need for a high school program to train young scientists was stressed by Dr. Waterman at the hearings.

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## PHYSICS

## Midwest to Have Two Accelerators

► THE MIDWESTERN UNIVERSITIES Research Association has been authorized by the Atomic Energy Commission to design and develop an ultra-high-energy particle accelerator of advanced design.

The AEC also authorized Argonne National Laboratory at Lemont, Ill., operated by the University of Chicago, to design a high-energy accelerator.

The Midwestern Universities Research Association has the following universities as associated members: Chicago, Illinois, Indiana, Iowa, Iowa State College, Michigan, Michigan State, Minnesota, Northwestern, Notre Dame, Ohio State, Purdue, Washington (St. Louis, Mo.), and Wisconsin.

The five-man planning committee for the project includes Frederick Hovde of Purdue University, chairman, and Virgil Hancher of the University of Iowa, Dr. Alfred W. Peterson of the University of Wisconsin, Herbert O. Farber of the University of Illinois, and Dr. John H. Williams of the University of Minnesota.

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## PSYCHOLOGY

## Admission of Fear Might Be Clue to Future Action

► YOUR OWN FEELINGS about how afraid you are of a situation can be a good clue to how you will react in the real situation.

Tests with airborne trainees learning to jump from a mock tower, made by Richard D. Walk of Cornell University, Ithaca, N. Y., show that a self-rating of fear often is an accurate prediction of things to come.

Trainees who admitted high fear during the jumping training, for instance, did not do as well in the course as those who said they were less afraid.

Trainees who admitted high fear tended to be those who said they were worried about injury in Airborne training or in combat, and admitted less confidence in their ability to perform adequately in combat or parachute jumping.

Those trainees who eventually passed the airborne course, Mr. Walk reports, had rated themselves less afraid than those who failed the course.

Of those who did pass, the ones who achieved correct jump technique early in training had shown lower fear ratings than those who did not learn the correct technique until late in the training.

Mr. Walk says the finding that admission of fear was related to previous confidence about stressful situations leads to a suggestion that questions specific to stress might help to weed out those persons who will be susceptible to stress in a given situation.

The study is reported in the *Journal of Abnormal and Social Psychology* (March).

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## VOLCANOLOGY

**Violent Earth Tremors Near Erupting Volcano**

► VIOLENT EARTH TREMORS near erupting Mount Ngauruhoe, New Zealand, may herald the volcano's biggest eruption in years.

At one time, 25 minor quakes rumbled within 90 minutes.

Mt. Ngauruhoe, 7,515 feet high, is New Zealand's most active volcano, located in a national park near the center of North Island.

A party of three attempted to climb to the main crater, but showers of red hot stones, some as big as a man's head, forced them back. All three had slight burns when they returned to camp.

Mt. Ngauruhoe erupted in 1954 and 1955, but caused no damage.

Frank Studt, chief geophysicist of the N. Z. Department of Scientific and Industrial Research, said there was little chance of the eruptions becoming dangerous.

"It could build up to something big, so we are keeping a close watch on the mountain," he added.

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## GENERAL SCIENCE

**Industry Should Supply Science Teachers**

► INDUSTRIES should release to schools qualified teachers in their ranks to supply the present emergency shortages of science teachers, particularly in high schools, and give them at least a year's pay to boot.

This suggestion, made by Brig. Gen. David Sarnoff, board chairman of the Radio Corporation of America, to the National Security Industrial Association meeting in Washington, is meeting with a mixed reception by educators and scientists.

The proposed "National Educational Reserve" is visualized by Gen. Sarnoff as a five-year interim program on a national Congress-authorized basis, with an organization similar to various military reserves.

In addition to those assigned to teaching from industry, the Reserve would mobilize retired scientists and engineers "whose knowledge and experience would make them inspiring teachers." Others would teach in night schools without giving up their industry jobs.

The proposed plan "would amount to the restitution by business of personnel it has siphoned off from the school system."

Other plans for cooperation between schools and industry in augmenting science teaching have been proposed. One experimental program underway in Ohio provides for an alternation between schools and industry for scientists and teachers.

Other proposals contemplate the part-time assignment of experts in subject matter to aid and enrich courses taught by individuals trained to teach but untrained in what they are trying to teach.

Educationalists have criticized the introduction into teaching of those who do not qualify as science teachers. In most states, teachers must have certificates obtainable only through study of education courses at teachers colleges.

On the other hand, scientists insist teachers cannot teach unless they know what they are teaching, that is, they must know science. Most of them believe a good scientist should be able to teach science even if he has had no formal "education" or teaching training.

Such conflicts will slow down use of any suggested reserve program.

Science News Letter, March 3, 1956

## DENTISTRY

**Nation's Teeth Are Orphans in Research**

► CONGRESS is being asked to put teeth into the fight to save America's teeth by appropriating more funds for:

1. Dental research by government and by dental schools and other dental research centers.

2. A home for federal dental research in the shape of a building for the National Institute of Dental Research at Bethesda, Md.

So far as research goes, our teeth are orphans. The 1957 budget proposals for the National Institutes of Health allot to the Institute of Dental Research less than \$3,000,000 of the \$126,525,000 proposed for all the Institutes.

Dental diseases, however, afflict 98% of all persons during their lifetime, the American Dental Association points out.

The Dental Association itself is currently paying the salary and supporting the research of nine scientists at the Bureau of Standards and four scientists at the National Institutes of Health.

The study on mottled enamel that led to discovery of the decay-preventing effect of small quantities of fluoride in drinking water was supported by a 1916 grant from the American Dental Association to Dr. Frederick S. McKay of Colorado Springs, Colo.

Discovery that the controlled addition of a tiny amount of fluoride ions, about one part per million, to domestic water supplies would reduce the incidence of dental decay by about two-thirds is one of the most significant contributions of research of the generation, the association points out.

Reducing dental decay, important as that is, makes up only part of the problem of keeping healthy teeth in our mouths. Diseases of the gums, such as pyorrhea, are taking an increasing toll of teeth at older ages. With more funds for research, a preventive for this might also be found.

The day might even come when dental disease could be reduced so that we could get dental insurance along with Blue Cross and Blue Shield insurance to pay the hospital and surgical bills.

Science News Letter, March 3, 1956

## IN SCIENCE

## BIOCHEMISTRY

**Extract Cancer Growth Factor From Liver**

► A SUBSTANCE that speeds the growth of cancers has been extracted from the liver, the American Cancer Society announced.

The extracts so far are crude ones. When the cancer-stimulating substance can be obtained in pure form, it is hoped a chemical can be found to block its action and slow down the cancer.

The research was done by Drs. Karl E. Paschkis, A. Cantarow and Joseph Stasney at Jefferson Medical School, Philadelphia.

Science News Letter, March 3, 1956

## EDUCATION

**Poor Teachers Belittle Students in Classes**

► A TEACHER who belittles the students is not only disliked, but ineffective.

This was shown by a study made at the University of Washington, Seattle, by Virginia W. Voeks of San Diego State College, San Diego, Calif.

Belittling or the use of sarcasm or overt ridicule was cited as the primary cause for listing a teacher as poor by 1,503 students who were surveyed.

Excellent teachers, on the other hand, almost never belittle the students or dwell on the obvious. These "effective" teachers were also rated by the students as being very clear in their presentation.

Belittling tactics, Miss Voeks states, "may have more lamentable repercussions" than just causing a student to dislike a teacher. They may seriously impair the student's ability to understand the lecture material and they may kill a student's interest in pursuing the work further.

Miss Voeks explains that a teacher may be belittled because he or she may sense that explanations are not clear and lectures are not stimulating. As a consequence, the teacher turns to ridicule. This she terms "a rather desperate resort."

Concern was also expressed over teachers' voices. A quarter of those teachers judged by the students as poor were described as talking too softly, mumbling or having other speech difficulties. The poor teachers were also said to come to class unprepared, do poor work at the blackboard, use poor texts and/or make unclear assignments. Effective or excellent teachers were rated with shortcomings too. They talk too rapidly and often assume class knows more than it really does.

Results of the study are reported in the *American Journal of Physics* (Feb.).

Science News Letter, March 3, 1956

## SCIENCE FIELDS

## NUTRITION

**Mix Fruit Juice and Milk Into Drink**

► A MILK-FRUIT JUICE drink has been perfected by Dutch scientists, the U. S. Department of Agriculture reported.

The new drink combines acid fruit juices with milk to make a colorful pasteurized food that will keep for several days or, if sterilized, for months.

Secret to the success of the combination lies in a substance that in itself can curdle milk, the scientists state. It is pectin, familiar to the housewife who puts up jelly or jam.

The Dutch discovered that by using a very high grade of pectin with milk and sugar and letting it stand, acid fruit juice can be added without coagulating. The pectin throws a protective coat over the homogenized milk molecules.

One recipe for the new drink called for 20 pounds of sugar dissolved in 4½ quarts of fresh milk. After this, 23 quarts of a solution containing two and one-half percent pectin preparation is added and mixed. After standing for a few minutes, 19 quarts of black currant juice is added. The milk mixture is left to stand for ten minutes and then pasteurized.

Other fruit juices, such as lemon and orange, can also be mixed to make the milk-fruit beverage.

The drink "has been favorably received in Holland," USDA reports. Additional experimental work is being carried on at the Institute of Research on Storage and Processing of Horticultural Produce at Wageningen University.

Science News Letter, March 3, 1956

## SURGERY

**Dressings Off Wounds Day After Operation**

► PATIENTS not only get out of bed the day after a surgical operation. Most of them now can safely have the dressings over their wounds removed within 24 hours.

Good results with this new procedure are reported by Drs. Louis T. Palumbo, Philip J. Monnig and Dudley E. Wilkinson of the Veterans Administration Hospital, Des Moines, Iowa, in the *Journal of the American Medical Association* (Feb. 18).

The uncovered clean surgical wounds seemed to heal faster and with less inflammation than similar operation wounds kept covered with sterile dressings up to the eighth day, as is customary.

Patients enjoyed watching their wounds heal and did not suffer any irritation of the wounds by bed covers or pajamas. The

only cases in which wounds broke down and opened were in patients who had sterile dressings on the wounds for the usual eight days.

The report covers results on two groups totaling 211 patients. In one group dressings were changed as needed, and removed and left off completely in 90% by the eighth day. In the other group, dressings were removed completely and left off in 98% within 24 hours after the operation. In 27 patients, the dressings were removed within the first six hours after the operation.

The wounds were on chest and abdomen. The operations included removal of appendix, removal of gallbladder, repair of inguinal hernias, partial removal of the stomach, and operations on the heart, intestines, nerves and veins.

Besides the good healing of the wounds, the surgeons point out that the new system saves surgical dressing costs, time of professional personnel in wound care, eliminates cumbersome dressings and avoids the irritation of adhesive tape.

Science News Letter, March 3, 1956

## ENGINEERING

**Plastic Piping Found To Be Safe and Useful**

► PLASTIC PIPING for water is coming.

Pipe made from plastics has been found to be both safe and weatherproof, Walter Tiedeman of the National Sanitation Foundation, Ann Arbor, Mich., told the American Society of Civil Engineers meeting in Dallas, Texas.

A three-year test with various plastic piping has shown that, when properly installed for water supply, the plastic pipe in no way affects the color, odor or flavor of the water. In addition, it was found that there are no toxic substances introduced and it does not interfere with chemicals added to the water.

Rats will eat through the pipe when it stands in the way of their food, Mr. Tiedeman said, but they showed no preference for the plastic over other substances.

Mr. Tiedeman reported the Foundation is developing a hallmark to be stamped on the plastic piping found to be safe for drinking water.

Plastics will also command a much larger share of building materials in the future, Prof. Albert G. H. Dietz of the Massachusetts Institute of Technology, Cambridge, Mass., told the Society.

Up until now, he said, plastics have been used in the role of non-structural materials. However, use of reinforced plastic dome-shaped buildings for the military shows that plastics can be used as semi-structural and structural materials, for both military and civilian construction.

Because most plastics are too weak or brittle, they will be used in building as composites in which high-strength fibers are embedded in resin binders, Prof. Dietz said.

Science News Letter, March 3, 1956

## MILITARY TACTICS

**Intercontinental Missiles Subject of Discussion****See Front Cover**

► INTERCONTINENTAL MISSILES have recently become the subject of considerable interest in the nation's capital, particularly in Congress.

As the House Armed Services Committee approved five projects aimed at stepping up United States efforts to develop the intercontinental ballistic missile, the Senate counterpart was warned that Soviet research may put the Russians ahead in the race for what has been called the "ultimate weapon," since the ICBM could carry a hydrogen bomb as warhead.

Trevor Gardner recently resigned as Assistant Air Force Secretary because he believed the missile program was not given sufficient priority. He believes Russia is already well ahead of the U. S. in developing an ocean-spanning missile.

In the photograph on the cover of this week's SCIENCE NEWS LETTER is the Air Force's Snark SM-62, the first U. S. intercontinental guided missile. It is shown on a cleared pad at Patrick Air Force Base, Fla., where it is undergoing tests.

Included in the five projects was construction of an "atmosphere-entry simulator" at the Ames Aeronautical Laboratory of the National Advisory Committee for Aeronautics, part of a \$15,400,000 expansion authorized for the Government's top aviation research agency.

Science News Letter, March 3, 1956

## HORTICULTURE

**Find Clue to Avocado Losses**

► SUMMER HEAT causes improper ripening and discoloration to avocados, a condition that involves considerable economic loss to the avocado industry.

Dr. Jacob Biale and Roy Young of the department of subtropical horticulture at the University of California at Los Angeles have found that temperatures as low as 77 degrees Fahrenheit may cause "heat damage" in the fruit after picking.

Relatively short exposures to temperatures above 86 degrees after picking will prevent the fruit from softening normally and cause it to turn black. Ethylene gas, sometimes used to promote ripening, accentuates the condition.

Storage temperatures of from 59 to 68 degrees seem to be ideal for ripening, the scientists reported.

As long as the avocado is on the tree, heat does not bother it, the scientists said. In spite of the fact the avocado is a subtropical fruit, it seems to have a low heat tolerance once it is picked.

It is recommended that avocados be rushed to a cool storage area immediately after picking.

Science News Letter, March 3, 1956

## TECHNOLOGY

# Printing Replaces Wiring

**Radios, TV sets and phonographs without internal wiring will soon be coming off the mass production line. They will use printed circuits instead of conventional wiring.**

By SCIENCE SERVICE

► SPAGHETTI is definitely on the way out, engineers agree.

They are not referring to Italian cuisine, but to the jumble of spaghetti-like wiring they have to contend with in today's electronic equipment.

Your radio and TV sets have their share of this spaghetti inside the chassis. More advanced electronic devices have wiring systems that look very much like a course from an over-generous Neapolitan kitchen.

This tangle of wires can be and is being eliminated by a fast-growing automatic production method called printed circuitry. In the system, a metallic pattern that looks somewhat like a printed maze is stamped or engraved onto a plastic card. The pattern replaces the wiring completely. Electric current courses through the printed lines just as it does through wires.

The system eliminates the tedious, time-consuming job of the solderer, who must connect each wire in a radio to the proper terminals. It may take him hours to wire up a complex electronic device like a radar set, but with printed circuit techniques, scores of similar devices could be run off by machine in the time it takes him to complete one.

## Lower Costs Foreseen

To the consumer, the high-speed production that printed circuits imply should mean far lower cost for common household devices. Printed circuit radios and TV sets, when mass produced, will also be more dependable and easier to maintain.

Smaller size of printed circuits, which lie flat on a card and do not bulge with tangled wires, can make wrist watch radios, television sets that you can hang on the wall like a picture and pint-sized electronic "brains" available at reasonable costs.

Once the circuit is printed on the card, machines drop the electronic components, like vacuum tubes, diodes, resistors, coils and the other electronic paraphernalia into place, completing the device's electronic works.

Thus the whole process for manufacturing the myriad of electronic devices can be handled by machine, a major step toward automation.

Engineers today are refining the technique. They are working hard to develop sub-miniature components to go with the printed circuits. Some components, such

as resistors and capacitors, can actually be printed onto the card with the wiring.

Designers envision the day when today's bulky components will be so small that the entire circuit for a radio or TV set would lie nearly flat on a card.

The invention of the transistor, a p-ea-sized semiconducting device that can replace the bulky vacuum tube, has given great impetus to printed circuitry. The marriage of the transistor and the printed circuit promises devices of extremely small size that cost far less and use less power.

To cut down further on size, engineers have developed sub-miniature parts that could be used with the transistor to complete the circuit.

A promising application of the new printed circuit technique is in the so-called electronic "brains." These digital computers, which can calculate in minutes what might take a skilled mathematician years, are made up in part of hundreds of identical switching units, called "flip-flops."

They have that name because they can register only two electronic reactions, cor-

responding to "yes" and "no." If a flip-flop cell, which in a sense corresponds to a human brain cell, could be reduced to the surface of a card, the size of the computer could be cut immensely.

DYSEAC, the National Bureau of Standards' newest digital computer, has about a thousand such circuits, each of which is partially printed.

The major electronic firms are now racing to be the first to make a small-sized computer with high versatility. The advantage, again, would be not only in size, but in production speed and low cost.

Maintenance, too, would be cheaper, since the flip-flop units would be cheap. If one went bad, a new one could simply be put in its place.

In your TV set of the future, the printed circuit could be used in conjunction with the newly developed flat TV tube and a flat electrostatic speaker to make a self-contained picture-like unit. Just hang it on any nail, plug it in and tune in your favorite television show.

One system is the National Bureau of Standards' "Tinkertoy" method. Identically shaped, notched ceramic wafers containing different printed circuits are stacked one upon the other to obtain the desired electronic effect. As in junior's erector set, the pieces must be assembled individually,



**2-D CIRCUIT**—The master pattern for a printed circuit is touched up by a Bell Laboratories engineer. From the negative, metallic imprints of the pattern that can replace wires will be mass produced. Bright lines on the master sheet indicate where the printed wiring will be engraved.

but machines can whip almost any type of device together very quickly.

Another system is provided by the Signal Corps and General Electric's new automated printed circuit system now being completed at Ithaca, N. Y., designed to serve as the heart of an automatic factory. This is the automatic phase of the "Auto-Sembly" system developed by the Fort Monmouth laboratories shortly after World War II. Pilot production is tentatively planned on selected Signal Corps equipment.

Complete circuits for a wide variety of devices can be assembled automatically in one step. Printed circuit cards are fed into the machine, which connects all the components in the proper place. The completed unit is then dipped into a solder bath where all the parts are securely fastened at once.

### System Very Flexible

One advantage of this system, worked out by the Army Signal Corps, is extreme flexibility. The machine can be set to make almost any type of electronic circuit, one right after the other. Circuit revisions can be made in the master pattern with very slight delay, the change being automatically accommodated through the system. Such a factory is seen as very important to national defense, for in a short time it can be converted to producing urgently needed electronic and communications units.

The basic system allows mass production, miniaturization and reduction in cost.

Wiring errors are eliminated, and completed units are tested and rejected automatically if faulty.

One of the first applications of the printed circuit was the proximity fuse, needed by the thousands in World War II. These electrical triggers for artillery set off the charge in a shell when it reached a specified distance from the target. Speed of production, accuracy and small size were essential, making the printed circuit ideal for the application.

### Printed Proximity Fuses

To produce them in such large quantities would have been a difficult chore indeed, but printed fuses filled the bill.

The proximity fuse gave the printed circuit its first big push. As the war progressed, more applications were found. Today many guided missiles, modern jet planes, radar beacons and other communications equipment employ the printed circuit.

The consumer is now benefiting from this military experience. A 1955 model Admiral television set was developed with its wiring printed on a plastic card on the chassis. Some radio sets employ these new 2-D circuits and the Webster-Chicago Corporation recently announced it has applied printed circuits to phonographs for the first time.

Printing has even invaded telephone communications. Tubes that pipe many con-

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versations at a time over long distances can be replaced by a printed microwave tube that has many of the properties of a coaxial cable.

New and important as it is, printed circuitry is an old art, borrowing techniques used for centuries in the manufacture of china and for decades in the engraving industry.

The most popularly used method of etching printed circuits uses essentially the same process that makes the metal images for the pictures and cartoons that appear in newspapers and magazines. The image of the circuit is printed photographically onto the surface of a metallic coated sheet of plastic. The areas where the printed wires are desired are protected by an anti-corrosive chemical. The plate is then immersed in a solution that eats away the unprotected metal, leaving the desired pattern. It has been estimated that about 75% of the printed circuits used today are produced in this way.

Most of the rest of the circuits are manufactured in very much the same way as china is decorated. Machines print or silk-screen the wiring pattern on a ceramic surface with metallic paint. The slab is then baked to fuse the paint to the surface.

In the third common method, a heat press stamps out the circuit on a plastic card coated with an adhesive-backed sheet of copper. The excess metal is then stripped off.

Printed wiring is primarily a production tool, Gustav Shapiro, chief of the engineering electronics section of the National Bureau of Standards, said. Nothing can be done with printed circuits that cannot be done with ordinary wiring, but the technique lends itself ideally to automation, the coming trend in industry.

Automation, or automatic assembly, has been described as the second industrial revolution, and printed circuits are destined to play an important part in it.

Science News Letter, March 3, 1956

## THE ART OF "Speakmanship" HOW TO TALK YET MAKE GOOD SENSE

Today more than ever, the difference between solid success and frustrating failure often hinges solely on one's ability to express oneself effectively—both in private and in public. As it happens, the laws of successful voice communication are no longer a mystery. They are quite simple and, with the new techniques, can nowadays be mastered readily by the person of average intelligence willing to read a little effort.

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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D.C. Request free publications direct from publisher, not from Science Service.

**CANCER OF THE LUNG:** Pathology, Diagnosis and Treatment—Milton B. Rosenblatt and James R. Lisa—*Oxford University Press*, 330 p., illus., \$15.00. Correlation between clinical and pathological findings has been stressed throughout to provide a more basic understanding to the problem of early diagnosis.

**ENJOYING MODERN SCIENCE:**—Victor C. Smith and W. E. Jones—*Lippincott*, 2nd ed., 466 p., illus., \$3.32. Science in readable form for the eighth grader.

**EXPLORING MODERN SCIENCE:**—Victor C. Smith and W. E. Jones—*Lippincott*, 2nd ed., 353 p., illus., \$3.12. The seventh grade textbook in the Science for Modern Living series.

**GUIDE TO INSTRUMENTATION LITERATURE:**—W. G. Bombracher, Julian F. Smith and Lyman M. Van der Pyl—*Gout, Printing Office*, National Bureau of Standards Circular 567, 156 p., paper, \$1.00. To assist research investigators, instruments users and others interested in utilizing the extensive and scattered literature on instrumentation.

**LOW COST HI-FI:**—Donald Carl Hoefer—*Arco*, 132 p., illus., \$2.00. Containing hundreds of hints for budget high fidelity.

**MODERN SURVEYING: For Civil Engineers**—Harold Frank Birchall—*Philosophical Library*, 2nd ed., 528 p., illus., \$15.00. Dealing with the subject of surveying in a practical manner to aid the engineer working in the field or on a definite project. Including photographic and aerial surveying.

**NINETEENTH SEMIANNUAL REPORT OF THE ATOMIC ENERGY COMMISSION:**—Lewis L. Strauss, Chairman—*Govt. Printing Office*, 200 p., illus., paper, 60 cents. Reporting the activities of the past six months, with a special section on the International Conference on the Peaceful Uses of Atomic Energy. (See SNL, Feb. 11, p. 95.)

**101 ATOMIC TERMS: And What They Mean**—*Esso Research and Engineering Co.*, 20 p., illus., paper, free upon request direct to publisher, 15 W. 51st St., New York 19, N.Y. A popular-type glossary defining terms used by atomic scientists, many of which are peculiar to atomic energy.

**THE POWER TO GO**—Merrill Denison—*Doubleday*, 324 p., illus., \$5.00. The story of the automotive industry in America.

**PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY: Volume 14, General Aspects of the Use of Radioactive Isotopes: Dosimetry—United Nations** (Columbia University Press), 305 p., illus., \$6.50. Describing production, handling and distribution of radioisotopes, as well as techniques that have been developed for the measurement of detailed properties of the various radioisotopes, including monitoring in industrial situations.

**ROCKS AND MINERALS:**—Richard M. Pearl—*Barnes & Noble*, 275 p., illus., \$1.95. Explaining how rocks and minerals are classified, how they can be recognized and identified, and how they should be collected and displayed. Including some color plates to aid identification.

**SCIENCE ACROSS THE LAND:**—Victor C. Smith and Barbara Henderson—*Lippincott*, revised ed., 223 p., illus., \$2.24. Giving suggestions for experiments for the fourth grader to do to help explain the new things he is learning about science.

**SCIENCE ALONG THE WAY:**—Victor C. Smith and Katherine Clarke—*Lippincott*, revised ed., 128 p., illus., \$1.72. Introducing the first grader to science.

**SCIENCE AROUND THE CLOCK:**—Victor C. Smith and Katherine Clarke—*Lippincott*, revised ed., 160 p., illus., \$2.00. A textbook for the third grade student.

**SCIENCE BEHIND THE SKIES:**—Victor C. Smith and Barbara Henderson—*Lippincott*, revised ed., 352 p., illus., \$2.48. Included in this textbook for the sixth grade students is a section on science fairs.

**SCIENCE THROUGH THE SEASONS:**—Victor C. Smith and Barbara Henderson—*Lippincott*, revised ed., 352 p., illus., \$2.36. For the fifth grader.

**SCIENCE UNDER THE SUN:**—Victor C. Smith and Katherine Clarke—*Lippincott*, revised ed., 160 p., illus., \$1.88. Science for the second grader.

**SOURCES OF INFORMATION AND UNUSUAL SERVICES:**—Raphael Alexander, Ed.—*Informational Directory Co.*, 4th ed., 64 p., paper, \$2.00. A guide to information, pamphlets and services available from organizations and agencies in the United States. The fourth edition contains 170 new entries.

**TERRACOTTA FIGURINES FROM KOURION IN CYPRUS:**—John Howard Young and Suzanne Halstead Young—*University Museum*, Museum Monographs, 260 p., illus., paper, \$5.50. A study of the mass of figurines uncovered by the excavations at Kourion, on the island of Cyprus, undertaken by the University Museum of Philadelphia between the years 1934 and 1948.

**THROUGH THE MATHESCOPE**—C. Stanley Ogilvy—*Oxford University Press*, 162 p., illus., \$4.00. In other sciences, such as astronomy, scientists have instruments like the telescope to aid them in their study. Although the matheoscope is not a physical instrument, it should help to "view" this introduction to some of the more interesting elements of mathematics "through the matheoscope," a term invented by Watson Davis, director of SCIENCE SERVICE.

**USING MODERN SCIENCE:**—Victor C. Smith and W. E. Jones—*Lippincott*, 2nd ed., 654 p., illus., \$3.96. A general science textbook for ninth grade students.

Science News Letter, March 3, 1956

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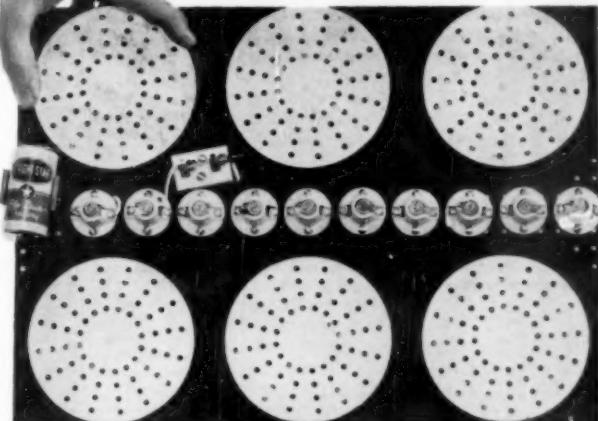
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12	4.85	4.00

Complete Set of 6 Brushes \$11.50

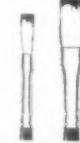


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**No. 180-B** Finest Quality Red Sable Oil "Brights." Finest quality red sable hair. Heavy body with thin tapered edge. Seamless nickel ferrules. Cherry stained lacquered hardwood handles. Made with care as the finest quality brush. Used for painting on smooth surfaces, detail work, miniature work, ceramics and hundreds of other uses. Made in U. S.

Size	Reg. Price	Our Price
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1	.55	.40
2	.60	.45
3	.70	.50
4	.80	.60
5	.95	.70
6	1.05	.80
7	1.15	.95
8	1.30	1.05



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### 110-F "FLATS"

Good quality white imported bristle with natural tapered ends. Extra long seamless nickel ferrules, clear hardwood handles. American sizes. An artist's oil brush of good quality.

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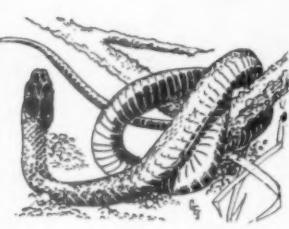
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HERPETOLOGY

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### The American Blacksnake

► WHEN LINNAEUS was giving scientific names to his pickled specimens from the New World, he awarded our American black snake, or black racer, the title of *Crotalus constrictor*, meaning in translation "the constrictor snake."

But since then, naturalists have become aware of a fact that old Linnaeus did not learn from his pickled snakes. The American blacksnake is not a constrictor. It relies chiefly on stealth and speed to capture its prey, and does not generally kill by squeezing. Thus, *C. constrictor* goes under a name it does not deserve.

Perhaps if that famous name-giver had known more about the natural history of the blacksnake, he would have called it, in proper Latin, something like the speeding snake, or the rattlesnake's friend, or satiny snake. All of these would fit it well.

The blacksnake is smooth and satiny in appearance, not shiny. The most familiar of the group of subspecies, *C. constrictor constrictor*, is uniformly black above and beneath, the only break in its color being a white patch on the chin and lower lip plates. Other subspecies show color variations, such as the blue racer, *C. constrictor flaviventralis*, which has a yellow under surface.

Blacksnakes are among the very fast crawlers of the snake family, so much so that their capture is often difficult if they choose to run instead of fight—and they can put up a valiant battle when cornered.

What seems lightning-like speed in a snake, however, is not always what it appears. Experiments have shown that the coachwhip, *Masticophis flagellum*, a very fast species and a close relative of the blacksnake, moves at a rate of only three miles per hour and prowls at a much slower one.

In winter, blacksnares and rattlers may use the same hibernating quarters, gliding in and out of a common entrance and sleeping harmoniously in the same under-

ground dormitory with each other. Tales of enmity between rattlesnakes and blacksnares are myths.

A six-foot blacksnake can be considered a very long one. Most reports of "blacksnares" of seven or eight feet length can usually be attributed to the mountain blacksnake, *Elaphe obsoleta*. This snake is similar in appearance but of an entirely different group and with different habits. This snake, by the way, is a constrictor.

It may be that Linnaeus had heard tales of this snake when he called our blacksnake a constrictor.

Science News Letter, March 3, 1956

## Questions

AGRICULTURE—How can waste cellophane aid in gardening? p. 133.

GENERAL SCIENCE—How many pounds of uranium 235 are being made available for use abroad? p. 133.

MEDICINE—What is heparin? p. 131.

PHYSIOLOGY—For what is the nose believed designed? p. 134.

PUBLIC HEALTH—Why should the fight against malaria be speeded? p. 134.

SURGERY—How soon after operations can dressings be removed? p. 137.

PHOTOGRAPHS: Cover, Northrop Aircraft, Inc.; p. 131, Atomic Energy of Canada Limited; p. 133, U. S. Army; p. 135, Carnegie Institute of Technology; p. 138, Bell Telephone Laboratories; p. 144, U-Fold-It-Company.

### MEDICINE

## Advanced TB Yields to Prolonged Drug Use

► EVEN FAR ADVANCED tuberculosis of the lungs with cavities can be checked by modern anti-TB drugs.

Good results with "indefinitely" prolonged treatment in six cases are reported by Drs. A. C. Douglas and N. W. Horne of Edinburgh City Hospital and the University of Edinburgh, Scotland, in the *British Medical Journal* (Feb. 18).

All the patients will acutely ill when admitted to the hospital. They were kept on bed rest and given streptomycin with either isoniazid or PAS for six months. After about six months, they were allowed gradually to be up and about, but the drugs were continued.

Marked improvement clinically and on X-ray examination followed in every case. Every one stopped having TB germs in their sputum in five months. They have continued to be sputum negative for 16 to 35 months.

The patients have now all been living at home for at least six months, some for much longer. Three housewives manage their homes unaided. The fourth woman patient is now employed at light work. One man, aged 68, is retired and able to enjoy his retirement. The sixth patient is incapacitated for any work because of chronic bronchitis and emphysema.

The patients continue to take their drugs and probably will have to do so indefinitely. They report to the hospital outpatient department about every three months. They are instructed to get medical attention early if they get a cold.

Interestingly, the doctors point out, only one patient has had a cold requiring specific treatment since leaving the hospital and that only once.

Science News Letter, March 3, 1956

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• **ARM REST COVERS** molded of polyethylene plastic protect new upholstery or conceal worn arm rests in autos. Available in a variety of colors, the covers are installed quickly by loosening two screws and slipping on the covers.

Science News Letter, March 3, 1956

• **CAR VACUUM CLEANER** is small enough to be stored in the glove compartment, ready for instant use. It operates off the vacuum system like a windshield wiper and requires no special tools for installation.

Science News Letter, March 3, 1956

• **OUTBOARD MOTOR** equipped with a speedometer is described as a first. The knotometer measures speed in both knots and miles per hour. Operating independently of the engine, the needle registers speed according to the resistance of the water. It is featured on three new models of motors.

Science News Letter, March 3, 1956

• **SECTIONAL MIRROR** is designed to give 160 degrees of rear-view for automobile drivers. The five-sectioned mirror is mounted without special tools. Its total length is 36 inches.

Science News Letter, March 3, 1956



• **FIVE-WAY CHAIR** grows with the baby. Its chrome legs can be telescoped or folded to make it progressively a high, car, youth, play and portable chair. The up-

holstered furniture for growing tots, shown in the photograph, is available in jonquil yellow, soft gray, dusty pink and turquoise.

Science News Letter, March 3, 1956

• **LISTENING AID** provides full-circle hearing. The aid's 150 parts have been integrated into a pair of specially-designed eyeglass frames and temples that can be fitted with prescription or plain lenses. The hearing aid requires no bulky batteries. The wearer is able to hear equally well in all directions.

Science News Letter, March 3, 1956

• **NIGHT LIGHT** for the nursery wall is a cute little yellow duck that rocks back and forth. Acting as a lamp shade, the duck is molded of translucent acetate plastic and is mounted in a metal frame designed to give a reverse shadow-box effect. It rocks independently of the light.

Science News Letter, March 3, 1956

• **HELMET LINER** for the winter is disposable. Designed for outdoor workers and sportsmen alike, the one-piece liner is made of a twill fabric interwoven on the inside with fleece. The liner has straps on top which tie on the helmet harness.

Science News Letter, March 3, 1956

An extra fillip for every week . . .

## SCIENCE NEWS LETTER for THE RIGHT PRESENT FOR PEOPLE WITH INTELLECTUAL CURIOSITY

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3-3-6

## Do You Know?

Laboratory experiments have shown that skin, in a special growth media, may be multiplied to ten times its original size in a period of two weeks.

One of the Government's most popular booklets, "Infant Care," has been revised eight times and has been translated into eight languages; over 30,000,000 copies have gone into circulation.

At about two degrees Kelvin, or minus 271 degrees centigrade, helium II moves spontaneously without any apparent reason; it creeps up the sides of its container and sends out a kind of sound wave called "second sound."

An acre of red cedar is worth \$1,500 under current market prices when sold for Christmas trees.

The best water for household use is neither acid nor alkaline but as nearly neutral as possible.

Births in the United States reached a new high of approximately 4,100,000 during 1955.